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(19) (CA) APPLICATION FOR CANADIAN PATENT (12)

(54) Method for Producing an Ice Hockey Stick and the Product Therefor

(72) Lo, Kun-Nan - Taiwan ;

(73) Same as inventor

(57) 13 Claims

Notice: The specification contained herein as filed

Canada

ABSTRACT OF THE DISCLOSURE

A method for producing an ice hockey stick includes the steps of forming an upper and a lower preform; wrapping an impregnated fiber laminate around the upper and lower preforms respectively; withdrawing the upper and lower preforms to form hollow upper and lower housings; passing an inflatable tube member through the upper and lower housings; disposing the upper housing on the lower housing and wrapping the impregnated fiber laminate around the upper and lower housings to form a fiber impregnated blade housing; inflating the tube member and heating the fiber impregnated blade housing in a mold to form a green blade section having a transverse reinforcing rib; removing the tube member from the green blade section and finishing the green blade section; and connecting the finished green blade section to a shaft section.

METHOD FOR PRODUCING AN ICE HOCKEY STICK AND THE PRODUCT THEREOF

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates a method for producing an ice hockey stick and the product thereof, more particularly to a method for producing an ice hockey stick which is made of impregnated fiber laminates and which has a transverse reinforcing rib formed in the blade of the ice hockey stick.

2. Description of the Related Art

Conventionally, ice hockey sticks are made of wood. Referring to Fig. 1, a conventional wooden ice hockey stick includes a blade (1) formed by laminating and adhering a plurality of wood strips (1a), a curve portion (2) which is formed by laminating a plurality of wood strips (2a) in a manner similar to the fabrication of the blade (1) and a shaft (3) adhered to the curve portion (2). The curve portion (2) must be heated so as to be bent manually. Therefore, manufacturing of such a wooded ice hockey stick is a troublesome process and precise bending of the curve portion (2) is difficult to achieve. In addition, such a wooded ice hockey stick is likely to break along the seams between the wood strips (1a) and (2a). Hence, the wooden ice hockey stick is not durable.

SUMMARY OF THE INVENTION

It is a feature of this invention to provide a method for producing an ice hockey stick which is easy to manufacture and which makes it easy to obtain high quality and precise bending of the curve portion.

It is another feature of this invention to provide an ice hockey stick which is durable.

Accordingly, the method for producing an ice hockey stick provided by this method of this invention has a shaft section and a blade section which includes a blade and a curve interconnecting the blade and the shaft section, the method comprising the steps of:

forming an upper and a lower preform which are shaped as an upper and lower half portion of the blade section of the ice hockey stick;

wrapping an impregnated fiber laminate around said upper and lower preforms respectively;

withdrawing said upper and lower preforms so as to form a hollow upper and lower housing each of which has a front and a rear open end;

passing an inflatable tube member with a closed end through the upper and lower housings;

disposing the upper housing on the lower housing and wrapping the impregnated fiber laminate around the upper and lower housings to form a fiber impregnated blade housing which encloses the front open ends of the upper and lower housings;

inflating the tube member in the upper and lower housings and heating the fiber impregnated blade housing in a mold for a predetermined period to form a green blade section having a transverse reinforcing rib which is integrally formed by an overlapping portion of the upper and lower housings;

removing the tube member from the green blade section and finishing the green blade section; and

connecting the finished green blade section to the shaft section.

Since, the ice hockey stick of this invention is formed by a molding process, the bending angle of the curve portion can be precisely controlled. In addition, the ice hockey stick of this invention is made of impregnated fiber laminates which is durable for impacting and striking.

BRIEF DESCRIPTION OF THE DRAWINGS

Other features and advantages of this invention will become apparent in the following detailed description of the preferred embodiments of this invention with reference to the accompanying drawings, in which:

Fig. 1 is a fragmentary exploded side view of a conventional wood ice hockey stick;

Fig. 2 is a flow diagram of the method for producing a preferred embodiment of an ice hockey stick of this invention;

Fig. 3 is a side schematic view of a preferred embodiment of the upper and lower preforms of the blade section of an ice hockey stick of this invention;

Fig. 4 is a side schematic view showing the preferred embodiment of the upper and lower preforms of the blade section of this invention which are wrapped with impregnated fiber laminates to form an upper and lower housing;

Fig. 5 is a side schematic view showing the preferred embodiment of the upper and lower housings of the blade section of this invention which are connected to one another and which have a tube member passing through;

Fig. 6 is a side schematic view showing the preferred embodiment of the upper and lower housings being wrapped by a impregnated fiber laminate and the tube member being inflated;

Fig. 7 is a side view showing the cross-sections of the blade section of the ice hockey stick of this invention at four positions;

Fig. 8 is a side schematic view showing the preferred embodiment of the ice hockey stick of this invention; and

Fig. 9 is a side schematic view showing another preferred embodiment of the blade section of an ice hockey stick of this invention having a striking mark formed thereon.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Fig. 2, a flow diagram of a method for producing an ice hockey stick of this invention is shown. An upper and lower preform (10, 10') with proper thickness are prepared as shown in Fig. 3. The upper and lower preforms (10, 10') are made of wood, plastic, or metal plate and are shaped as an upper and lower half portion of a blade section of an ice hockey stick, as shown in block 1. Two to five layers of impregnated carbon fibers are wrapped around the upper and lower preforms (10, 10') respectively to form an impregnated fiber laminate with a desired thickness, as shown in Fig 4. other typesimpregnated fibers, such as impregnated glass fibers, may also be used. The carbon fibers may be wrapped at an intersection angle of 0°, 30°, 45°, 90° or the combination thereof, as shown in block 2. The upper and lower preforms (10, 10') are then withdrawn from the upper and lower housing (20, 20'), as shown in block 3. Thus, a hollow upper and lower housing (20, 20') is formed around the upper and lower preforms (10, 10'). Each of the upper and lower housings has a front and rear open end [(21, 22), (21', 22')], as shown in Fig. 5.

An inflatable tube member (30) with a closed end (31) passes from the open rear end (22) of the hollow upper housing (20) through the open front end (21) of the hollow upper housing (20), the open front end (21') of the hollow lower housing (20') and out of the open rear end (22') of the hollow lower housing (20'), as shown in block 4. The tube member (30) is made of oriented propylene or nylon. The upper housing (20) is then disposed on the lower housing (20'), as shown in block 5. The outline of the combination of the upper and lower housing is similar to that of the blade section of the ice hockey stick, as best illustrated in Fig. 5.

The overlapped upper and lower housings (20, 20') are wrapped by impregnated carbon fibers so as to form a fiber impregnated blade housing (40) in a manner similar to the wrapping of the preforms (10, 10'), as shown in block 6. The fiber impregnated blade housing 40 encloses the front open ends (21, 21') of the upper and lower housings (20, 20'). The tube member (30) is inflated with air having an air pressure of 4-10 kg/cm² and the fiber impregnated blade housing (40) is heated in a mold for about 30-60 minutes, as shown in block 7. A green blade section having a transverse reinforcing rib (50) is integrally formed by an overlapping portion of the upper and lower housings (20, 20'), as shown in Fig. 7. The transverse reinforcing rib (50) has a width gradually increasing from the front end toward the rear end of the green blade section, as best illustrated in the cross-sections at four different positions of Fig. 7. The tube member (30) is then removed from the green blade section, and thereby forming a hollow green blade which includes a blade (60) and a shank (70) connected to the blade 60 are formed, as shown in block 8. The hollow green blade section is finished, as shown in block 9. A foamed material may fill in the hollow green blade to increase its shock-absorbing ability. A hollow shaft section (80) is connected to the finished green blade section by a hot melt glue (81), as shown in block 10. Thereby, when the shank (70) of the blade section is cracked and/or broken, the user can heat the hot melt glue (81) so as to melt the same in order to separate the shaft section (80) from the blade section and connected a new blade section to the shaft section (80) by means of the hot melt glue (81). The shaft section (80) is made of an aluminum alloy or carbon fiber. The free end of the shaft section (80) is connected to a handle and an ice hockey stick of this invention is thus obtained, as best illustrated in Fig. 8. To increase the binding strength of the shank (70) and the shaft section (80), grooves (72) are formed on the shank (70) and projections (not shown) are correspondingly formed on the inside face of the hollow shaft section (80). A striking mark (61) may be provided on the face of the blade (60), as shown in Fig. 9. The striking mark (61) may be in the form of slots, studs or ridges.

Therefore, an ice hockey stick of this invention can be formed by a molding process and the bending angle of the curve portion can be precisely controlled. The obtained ice hockey stick, which is made of impregnated fiber laminates, is light-weight and is durable for impacting and striking because of the transverse reinforcing rib. The reinforcing rib of the ice hockey stick also increases the rigidity and recovery coefficient of striking of the blade section. Thus, the contacting time between the blade section and the puck is reduced, thereby increasing the bursting power of striking.

With this invention thus explained, it is apparent that numerous modifications and variations can be made without departing from the scope and spirit of this invention. It is therefore intended that this invention be limited only as indicated in the appended claims.

I CLAIM:

1. A method for producing an ice hockey stick having a shaft section and a blade section which includes a blade and a curve interconnecting said blade and said shaft section, said method comprising the steps of:

forming an upper and a lower preform which are shaped as an upper and lower half portion of said blade section of said ice hockey stick;

wrapping an impregnated fiber laminate around said upper and lower preforms respectively;

withdrawing said upper and lower preforms so as to form a hollow upper and lower housing each of which has a front and a rear open end;

passing an inflatable tube member with a closed end through said upper and lower housings;

disposing said upper housing on said lower housing and wrapping said impregnated fiber laminate around said upper and lower housings to form a fiber impregnated blade housing which encloses said front open ends of said upper and lower housings;

inflating said tube member in said upper and lower housings and heating said fiber impregnated blade housing in a mold for a predetermined period to form a green blade section having a transverse reinforcing rib which is integrally formed by an overlapping portion of said upper and lower housings;

removing said tube member from said green blade section and finishing said green blade section; and

connecting said finished green blade section to said shaft section.

2. A method for producing an ice hockey stick as claimed in Claim 1, wherein each of said upper and lower preforms has a thickness of 1.5 to 5 mm.

3. A method for producing an ice hockey stick as claimed in Claim 1, wherein said impregnated fiber laminate is made of impregnated carbon fibers.

4. A method for producing an ice hockey stick as claimed in Claim 1, wherein said impregnated fiber laminate is made of impregnated glass fibers.

5. A method for producing an ice hockey stick as claimed in Claim 1, wherein said inflatable tube member is made of nylon.

6. A method for producing an ice hockey stick as claimed in Claim 1, wherein said inflatable tube member is made of oriented propylene.

7. A method for producing an ice hockey stick as claimed in Claim 1, wherein said inflatable tube member is inflated with a gas pressure of 4 to 10 Kg/cm² and said predetermined period of said heating step is 30 to 60 minutes.

8. A method for producing an ice hockey stick as claimed in Claim 1, wherein said connecting steps includes connecting said finished green blade section to said shaft section by means of a hot melt glue.

9. A method for producing an ice hockey stick as claimed in Claim 1 further including the step of forming a striking mark on said blade.

10. A method for producing an ice hockey stick as claimed in Claim 1 further including the step of providing a foamed material in said green blade section.

11. An ice hockey stick comprising a shaft section and a hollow blade section connected to said shaft section, said blade section being made of an impregnated fiber and having a transverse reinforcing rib formed therein.

12. An ice hockey stick as claimed in Claim 11, wherein a hot melt glue is provided to said shaft and said hollow blade sections.

13. An ice hockey stick as claimed in Claim 11, wherein said hollow blade section is filled with a foamed material.

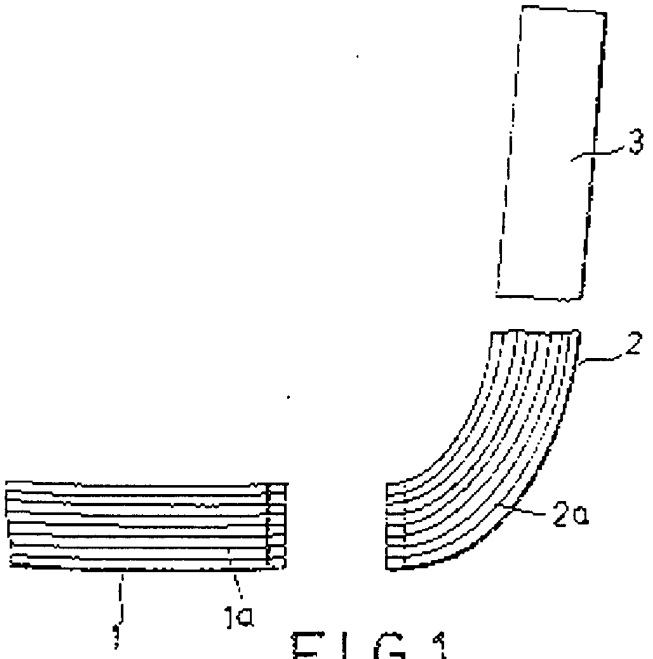

FIG.1
PRIOR ART

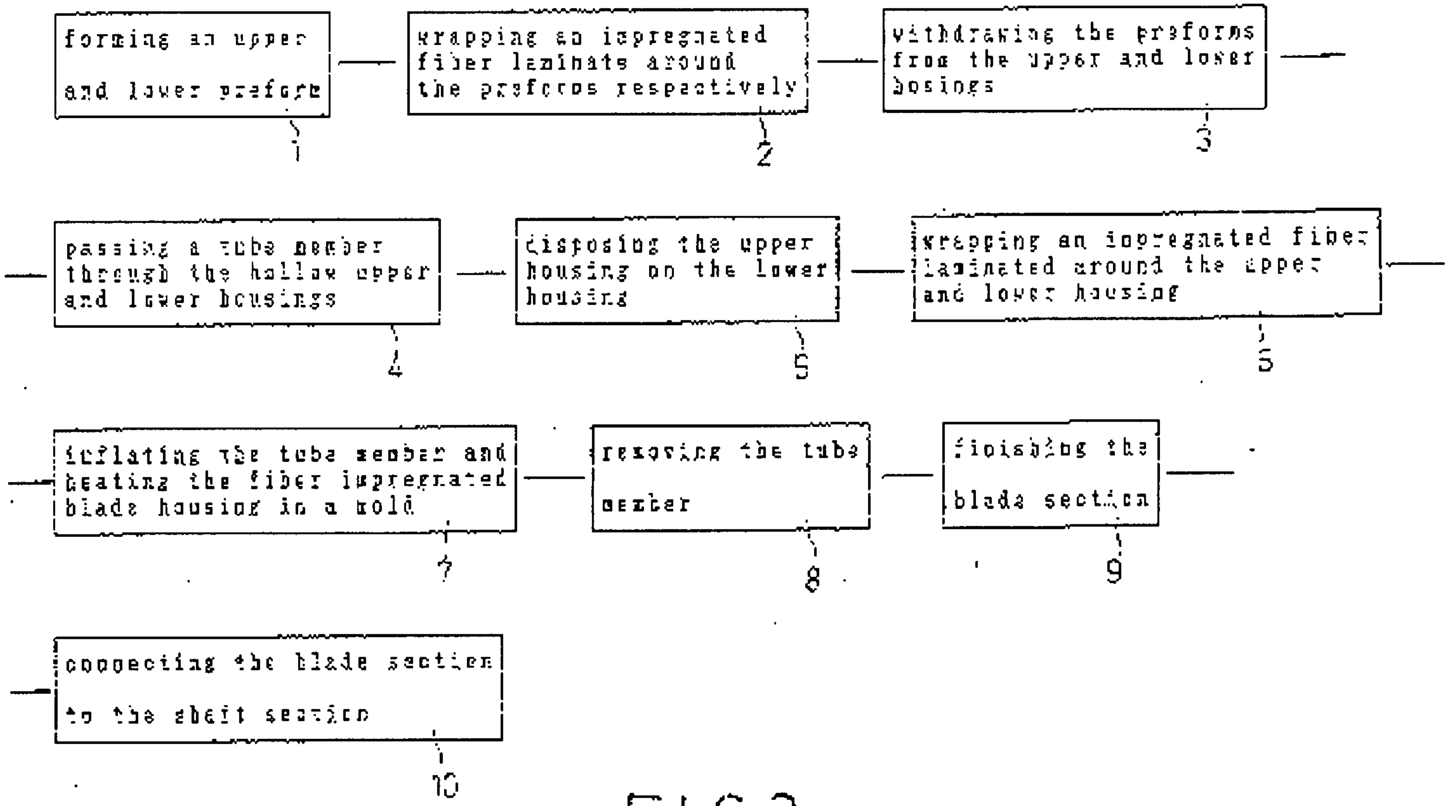
forming an upper and lower preform
1
wrapping an impregnated fiber laminate around the preforms respectively
2
withdrawing the preforms from the upper and lower housings
3
passing a tube member through the hollow upper and lower housings
4
disposing the upper housing on the lower housing
5
wrapping an impregnated fiber laminated around the upper and lower housing
6
inflating the tube member and heating the fiber impregnated blade housing in a mold
7
removing the tube member
8
finishing the blade section
9
connecting the blade section to the shaft section
10

FIG.2

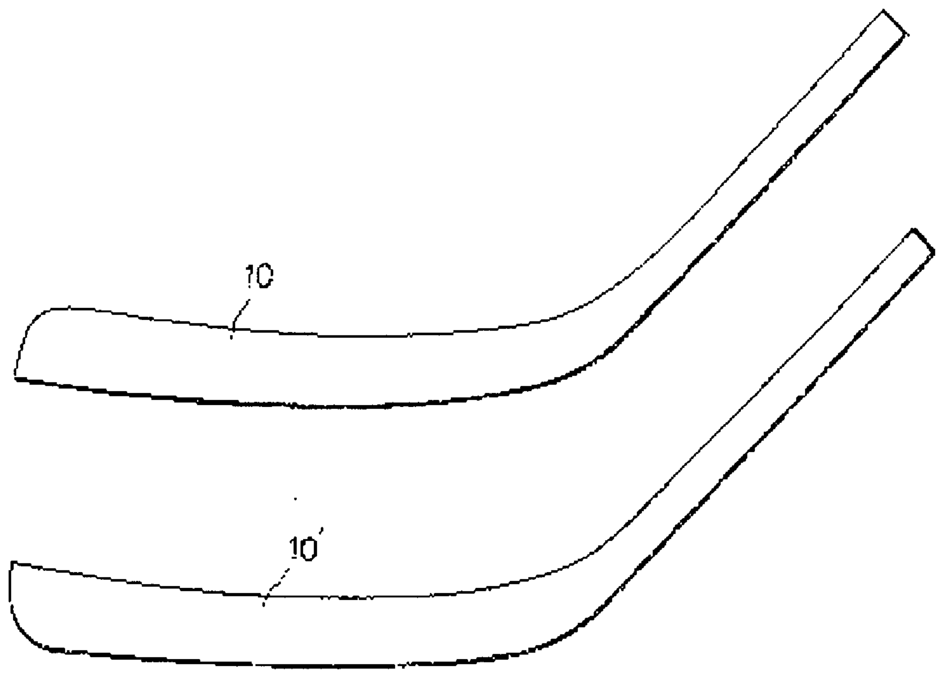

FIG.3

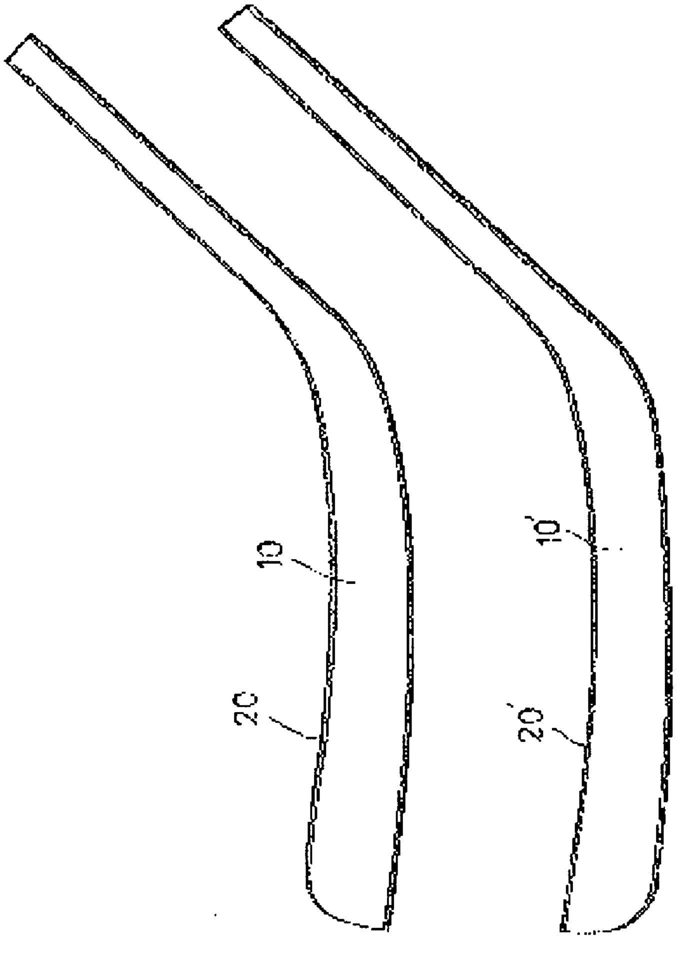

FIG.4

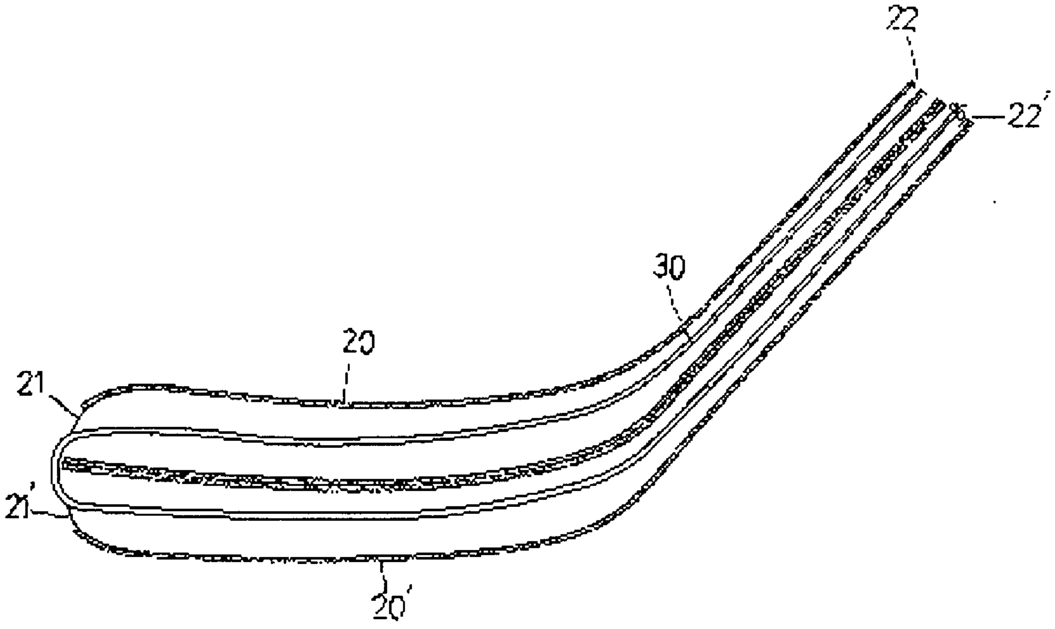

FIG.5

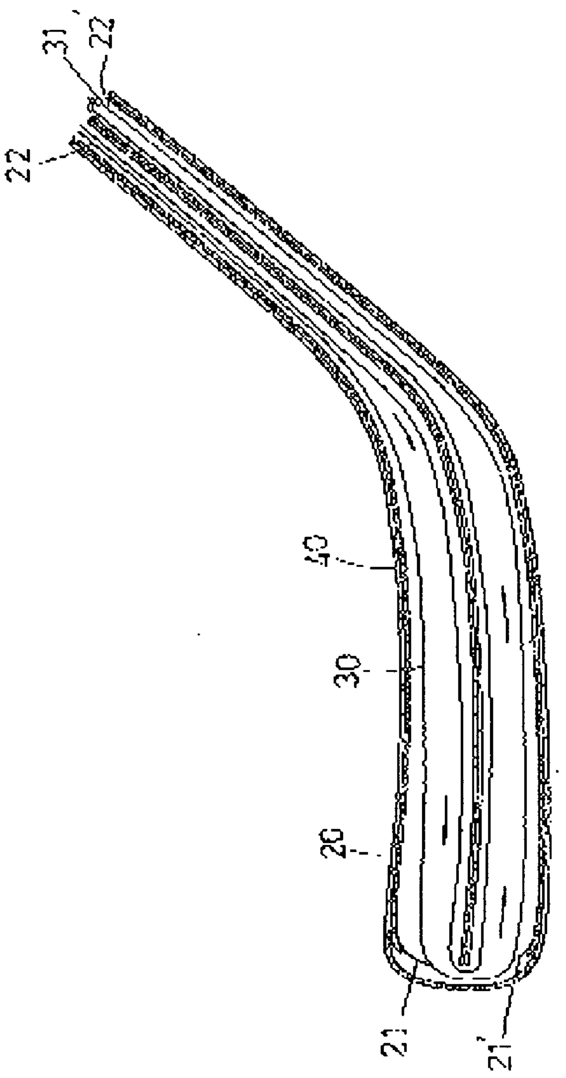

FIG. 6

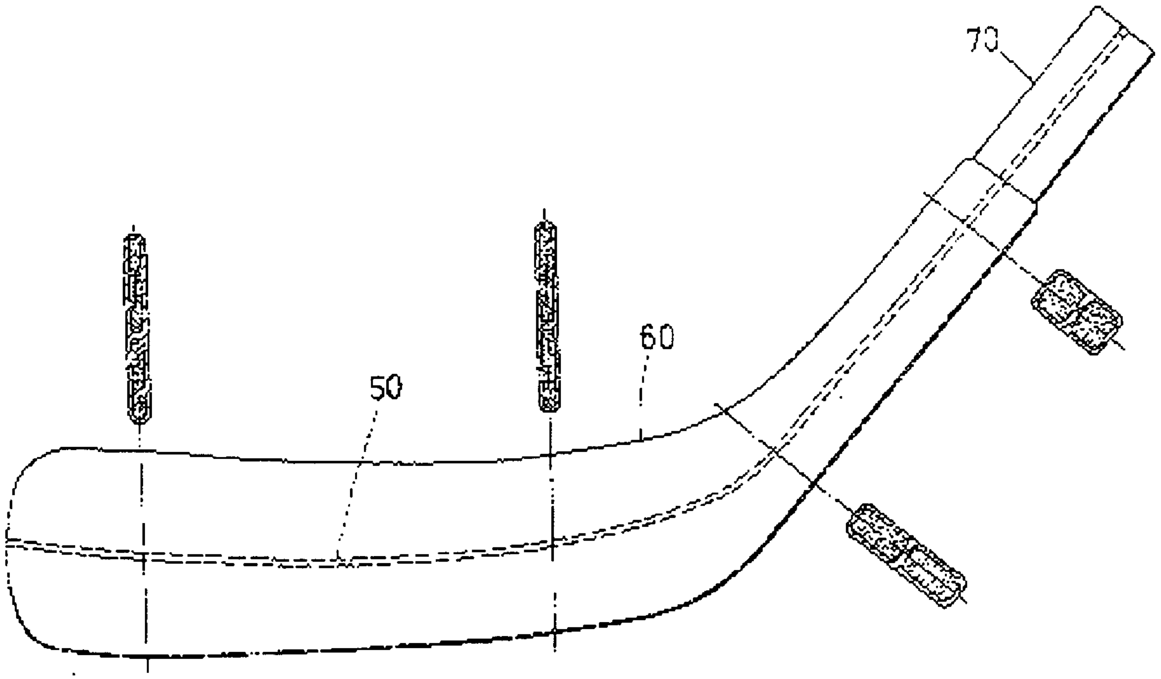

FIG.7

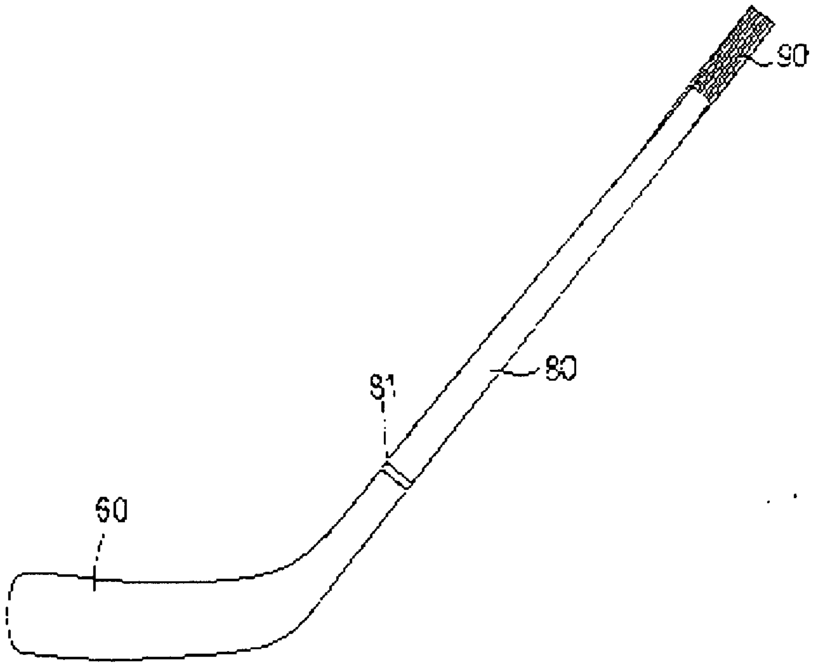

FIG. 8

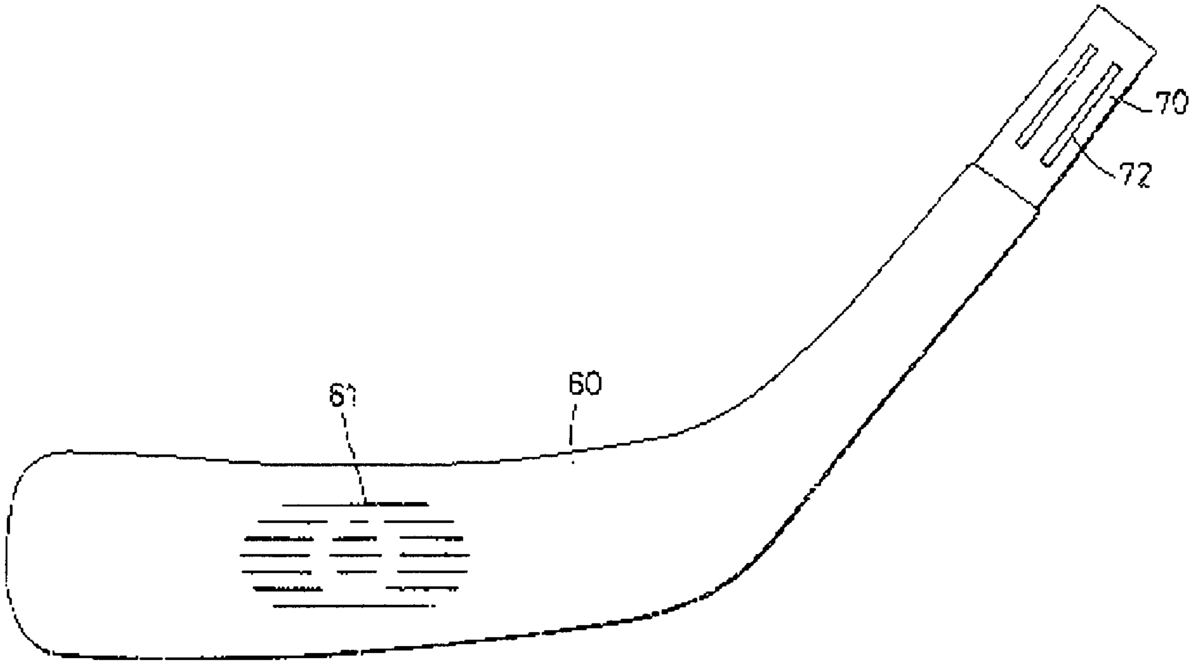

FIG.9